CLAIMS

What is claimed is:

1. An orthosis comprising a single, unitary body made of composite carbon fiber, the unitary body comprising:

a generally spiral-shaped lower leg portion that, when the orthosis is worn, covers at least a portion of the anterior surface of the wearer's lower leg and at least a portion of the posterior surface of the wearer's lower leg; and

a foot plate portion that, when the orthosis is worn, accepts the wearer's foot.

2. The orthosis of claim 1, wherein the foot plate portion comprises:

an anterior section; and

a posterior section,

wherein, when the orthosis is worn, the wearer's toes contact the anterior section and the wearer's heel contacts the posterior section.

3. The orthosis of claim 1, wherein:

the unitary body transfers mechanical energy while the wearer is walking;

the unitary body uses the transferred mechanical energy to stop the wearer's knee from hyperextending; and

the unitary body maintains the wearer's foot in a position that allows the heel of the person's foot to contact the ground before the rest of the wearer's foot.

4. The orthosis of claim 1, wherein the lower leg portion comprises an ascending section that extends from the foot plate section and curves toward the anterior surface of the wearer's lower leg to form a shin section.

5. The orthosis of claim 4, wherein, from the shin section, the lower leg portion continues to spiral around at a least a portion of a lateral surface of the wearer's lower leg and transitions into a calf section.

6. The orthosis of claim 5, wherein the calf section terminates in an upper end of the lower leg portion and begins to spiral back toward the anterior surface of the wearer's lower leg.

7. The orthosis of claim 1, wherein the lower leg portion is configured to spiral upward from the foot plate portion and make contact with an anterior surface of the wearer's lower leg prior to making contact with a posterior surface of the wearer's lower leg as the lower leg portion ascends.

8. The orthosis of claim 7, wherein the angle at which the lower leg portion spirals upward gradually decreases as the lower leg portion nears the calf of the wearer.

9. An orthosis comprising a single, unitary body, the unitary body comprising:

a generally spiral-shaped lower leg portion that, when the device is worn, covers at least a portion of the anterior surface of the wearer's lower leg and at least a portion of the posterior surface of the wearer's lower leg; and

a foot plate portion that, when the device is worn, accepts the wearer's foot,

wherein the lower leg portion is configured to spiral upward and clockwise from the foot plate portion and, as it ascends, to make contact with an anterior surface of the wearer's lower leg prior to making contact with a posterior surface of the wearer's leg.

10. The orthosis of claim 9, wherein the foot plate portion comprises:

an anterior section; and

a posterior section,

wherein, when the orthosis is worn, the wearer's toes contact the anterior section and the wearer's heel contacts the posterior section.

11. The orthosis of claim 9, wherein:

the unitary body transfers mechanical energy while the person is walking;

the unitary body uses the transferred mechanical energy to stop the person's knee from hyperextending; and

the unitary body maintains the person's foot in a position that allows the heel of the person's foot to contact the ground before the rest of the person's foot.

12. The orthosis of claim 9, wherein the lower leg portion comprises an ascending section that extends from the foot plate section and curves toward the anterior surface of the wearer's lower leg to form a shin section.

13. The orthosis of claim 12, wherein, from the shin section, the lower leg portion continues to spiral around at a least a portion of a lateral surface of the wearer's lower leg and transitions into a calf section.

14. The orthosis of claim 13, wherein the calf section terminates in an upper end of the lower leg portion and begins to spiral back toward an anterior surface of the wearer's lower leg.

15. The orthosis of claim 9, wherein the lower leg portion is configured to spiral upward from the foot plate portion and make contact with an anterior surface of the wearer's lower leg prior to making contact with a posterior surface of the wearer's lower leg as the lower leg portion ascends.

16. The orthosis of claim 15, wherein the angle at which the lower leg portion spirals upward gradually decreases as the lower leg portion nears the calf of the wearer.

17. The orthosis of one of claims 1-16, wherein the foot plate portion is generally contoured to complement at least a portion of the plantar surface of the wearer's foot so as to permit the wearer to wear shoes or sandals.

18. The orthosis of one of claims 1-16, wherein the unitary body comprises:
an inner surface; and
a lining material attached to the inner surface.

19. The orthosis of claim 18, wherein the lining material is removably attached to the inner surface.

20. The orthosis of claim 18, wherein the lining material is removably attached to the inner surface using Velcro™.

21. The orthosis of one of claims 1-16, wherein the unitary body is made of composite carbon fiber.

22. The orthosis of one of claims 1-16, wherein the lower leg portion comprises a section that extends from the foot plate section.

23. The orthosis of claim 22,
wherein the foot plate section comprises a posterior section, and
wherein the section that extends from the foot plate section is disposed at about 1/4 of the length of the foot plate section from the posterior section.

24. The orthosis of one of claims 1-16, wherein the lower leg portion comprises an ascending section that extends from the foot plate section and curves toward the anterior surface of the wearer's lower leg to form a shin section.

25. The orthosis of claim 24, wherein, from the shin section, the lower leg portion continues to spiral around at a least a portion of a lateral surface of the wearer's lower leg and transitions into a calf section.

26. The orthosis of claim 25, wherein the calf section terminates in an upper end of the lower leg portion and begins to spiral back toward the anterior surface of the wearer's lower leg.

27. The orthosis of one of claims 1-16,

wherein the foot plate portion and the lower leg portion are disposed at an angle with respect to one another, and

wherein the difference between the angle and 90 degrees is between about 7 degrees and about 14 degrees.

28. The orthosis of one of claims 1-16,

wherein the foot plate portion and the lower leg portion are disposed at an angle with respect to one another, and

wherein the difference between the angle and 90 degrees is between about 9 degrees and about 12 degrees.

29. The orthosis of one of claims 1-16,

wherein the foot plate portion and the lower leg portion are disposed at an angle with respect to one another, and

wherein the difference between the angle and 90 degrees is about 10 degrees.

30. The orthosis of one of claims 1-16,

wherein the foot plate portion and the lower leg portion are disposed at an angle with respect to one another, and

wherein the difference between the angle and 90 degrees is between about 20 degrees and about 25 degrees.

31. The orthosis of one of claims 1-16,

wherein the foot plate portion and the lower leg portion are disposed at an angle with respect to one another, and

wherein the difference between the angle and 90 degrees is between about 9 degrees and about 12 degrees.

32. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a front edge and a back edge,

wherein the back edge is elevated above the front edge.

33. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a front edge and a back edge,

wherein the distance between the back edge and ground level is about twice the distance between the front edge and ground level.

34. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a front edge and a back edge,

wherein the distance between the back edge and ground level is about 1 inch and the distance between the front edge and ground level is about 1/2 inch.

35. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises an anterior section and a posterior section,

wherein the difference in elevation between the anterior section and the posterior section is greater than 0 centimeters and no greater than about 3 centimeters.

36. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises an anterior section and a posterior section,

wherein the difference in elevation between the anterior section and the posterior section is between about 1.7 centimeters and about 2.3 centimeters.

37. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises an anterior section and a posterior section,

wherein the difference in elevation between the anterior section and the posterior section is about 2.

38. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises an anterior section and a posterior section,

wherein the difference in elevation between the anterior section and the posterior section is between about 1 centimeter and about 1.5 centimeters.

39. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises an anterior section and a posterior section,

wherein the difference in elevation between the anterior section and the posterior section is between about 2.5 centimeters and about 3 centimeters.

40. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a medial side and a lateral side,

wherein the difference in elevation between the medial side and the lateral side is greater than 0 millimeters and no greater than about 10 millimeters.

41. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a medial side and a lateral side,

wherein the difference in elevation between the medial side and the lateral side is between about 2 millimeters and about 3 millimeters.

42. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a medial side and a lateral side,

wherein the difference in elevation between the medial side and the lateral side is between about 5 millimeters and about 7 millimeters.

43. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a medial side and a lateral side,

wherein the difference in elevation between the medial side and the lateral side is between about 8 millimeters and about 10 millimeters.

44. The orthosis of one of claims 1-16,

wherein the foot plate portion comprises a medial side and a lateral side,

wherein the difference in elevation between the medial side and the lateral side is greater than 0 millimeters and no greater than about 1 millimeter.

45. The orthosis of one of claims 1-16, wherein the foot plate portion has a substantially flat outer surface.